Before the
FEDERAL COMMUNICATION COMMISION
Washington, D.C. 20554

In the Matter of	)	
	)	
Request by Humatics for Waiver of	)	ET Docket No. 19-242
Section 15.519(a) of the Commission's Rules	)	

To: Chief, Office of Engineering and Technology

REPLY COMMENTS OF HUMATICS

Humatics Corporation ("Humatics") submits these reply comments in support of its Request for Waiver of Section 15.519(a) of the Federal Communications Commission's ("FCC" or "Commission") rules filed in the above captioned proceeding.[1] Notably, the only comments received in response to Humatics' Waiver Request were filed by the GPS Innovation Alliance ("GPSIA"), which sought limited clarifications on the scope of the request. Below, Humatics provides additional, more detailed product specifications for its Spatial Intelligence Platform ("Platform") while also explaining its planned deployment scenarios.[2] These clarifications demonstrate that Humatics' requested waiver will not result in any increased risk of harmful interference to GPS and discuss how GPS is used to optimize the Humatics Platform. Due to the limited nature of GPSIA's comments, and Humatics' ability to address all concerns raised in the

[1] *See* Humatics Request for Waiver, ET Docket No. 19-242 (filed July 16, 2019) ("Waiver Request"); *see also Office of Engineering and Technology Seeks Comment on Humatics Corporation Request for Waiver of Section 15.519(A) of The Rules for an Ultra-Wideband System That Employs Fixed Infrastructure*, Public Notice, ET Docket No. 19-242 (rel. Aug. 27, 2019).

[2] *See* Comments of the GPS Innovation Alliance, ET Docket No. 19-242 (filed Sept. 16, 2019) ("GPSIA Comments").

record, we respectfully urge the Commission to expeditiously review and approve the Waiver Request.

I. BACKGROUND.

On July 16, 2019, Humatics filed a Request for Waiver of Section 15.519(a) of the Commission's rules to fully optimize its Platform by allowing certain devices to be installed as fixed infrastructure.[3] As stated in its request, Humatics believes grant of its waiver request would not undermine the fundamental purposes of the rule and is in the public interest.[4] As discussed in its filing, the Humatics microlocation platform will dramatically improve safety, efficiency, and performance for workers and businesses inside industrial, transportation, and commercial work sites by: (1) enabling new use cases (autonomous navigation in complex environments) in areas otherwise inaccessible by robotic vehicles; (2) permitting tracking of transit vehicles, carts, and other high-value assets in locations currently prohibited by existing technology; and (3) allowing for precise, positive identification of personnel in remote and potentially hazardous environments. In addition, the nature of Humatics' operations will allow fixed infrastructure devices to be reliably deployed without any risk of harmful interference.

In response to the Commission's Public Notice seeking comment on the Waiver Request, GPSIA filed comments noting its appreciation for the potential value of the Humatics Platform and the importance of prompt review and response to all such waiver requests.[5] GPSIA also requested, however, that the Commission withhold action on the Waiver Request until Humatics

[3] *See* 47 C.F.R. §15.519(a) ("UWB devices operating under the provisions of this section must be hand held, i.e., they are relatively small devices that are primarily hand held while being operated and do not employ a fixed infrastructure.").

[4] Waiver Request at 9.

[5] GPSIA Comments at 2. GPSIA does not formally oppose grant of the Humatics Request for Waiver as long as the Alliance's two concerns are addressed. *See id.*

"completes the record . . . by submitting certain technical and clarifying information."[6] Specifically, GPSIA requested that Humatics provide product specifications for its Ultra-Wideband ("UWB") module and confirm that its waiver is for specific industrial microlocation applications—not wide-scale urban deployment scenarios.[7] Humatics herein responds in good faith to each of GPSIA's noted concerns, detailing product specifications for its Platform, and confirming the narrow scope of planned UWB deployments.

II. DISCUSSION.

A. Humatics Equipment.

As referenced above, GPSIA's comments requested that Humatics make available certain product specifications regarding the Humatics UWB module.[8] In support of full transparency, Humatics supplements the record on its Waiver Request by providing the requested specifications as set forth in Exhibit A attached hereto.

The UWB module utilized by Humatics will not increase the risk of harmful interference to GPS. As noted in the Waiver Request, Humatics has developed other UWB equipment that fully protects GPS reception and the new product (as described in detail below) will maintain the same required protections for GPS.[9] Moreover, Humatics in fact relies on GPS as an input into its outdoor location engine to cross-check UWB results and also utilizes high-precision GPS to validate test results for independent testing. Without successful GPS operation, Humatics' testing and outdoor operation would be degraded. As a result, Humatics is fully invested in

---

[6] *Id.* at 1.

[7] *Id.* at 2.

[8] *Id.*

[9] *See* Waiver Request at 12, n.11; *see also* Waiver Request Attachment (demonstrating that radiated emission in the GPS receive band are well below the protection levels required by the Commission).

successful GPS operation and would be a concerned party if either its own hardware or other sources introduced harmful interference to GPS reception.

B. Scope of Request for Waiver.

GPSIA also requested that Humatics clarify the limited scope of its UWB module and confirm that the Platform will not be deployed for wide-scale urban deployments.[10] In support of this request, GPSIA noted that while Humatics' Waiver Request made the case that its equipment will be limited to peer-to-peer operations in discrete industrial, transportation, or commercial settings, the Humatics website has certain marketing materials that appear to depict broader deployments.[11] GPSIA correctly acknowledged, as Humatics claimed in its waiver request, that the limitations associated with Section 15.519(a) were designed by the Commission to ensure that UWB systems are essentially prohibited from creating networks, such as wide area networks, and to limit their deployment to peer-to-peer operations.[12]

As an initial matter, the Humatics marketing material referenced by GPSIA is not reflective of the planned deployment of the Platform under the Waiver Request. The picture, which was included in the website early in the company's rollout, was offered as a way to provide prospective customers with a more intuitive sense of the accuracy of Humatics' Platform, rather than as a specific use case. For clarity and to resolve any ambiguity, Humatics reiterates that it is not seeking a waiver to create a wide-area network. Instead, customers will deploy its devices only in controlled environments, such as industrial, transportation, or commercial areas, to allow for positioning information to be provided—not widespread

[10] GPSIA Comments at 3.

[11] *See id.* at 4.

[12] *See id.* at 3-4 (citing Waiver Request at 12).

communications or data. By controlling installations through Humatics or a qualified installer and limiting them to industrial, transportation, or commercial environments, the requested waiver would not undermine the protections associated with the Part 15 technical rules for such devices. Therefore, the Commission can be assured that the requested waiver would be in the public interest and protect other wireless operations, including GPS, from harmful interference.

III. CONCLUSION.

Humatics appreciates the comments of GPSIA and the opportunity to provide the above referenced specifications and clarification regarding its planned operations. With the resolution of these matters above, no formal opposition to Humatics' Waiver Request has been entered into the record. Further, as discussed above, grant of the waiver request will not undermine the fundamental purposes of the Commission's rules and is in the public interest. Therefore, Humatics respectfully urges the Commission to expeditiously review and approve the requested waiver.

Respectfully Submitted,

HUMATICS CORPORATION

/s/ David Mindell

David Mindell
152 Grove Street, Suite 1500
Waltham, MA 02453

October 1, 2019

cc: Julius Knapp
Aspasia Paroutsas
Jamison Prime
Karen Rackley

EXHIBIT A

Summary and Theory of Operations

The Humatics radio (the "Radio") is an Ultra Wideband ("UWB") transceiver that uses Two-Way Time-of-Flight ("TW-TOF") ranging to measure the distance between two or more radios. These measurements have an accuracy of less than 2 centimeters and are provided at rates up to 125 Hz. The Radio is a coherent radio transceiver. This means that the energy in each transmitted pulse can be summed to increase the Signal-to-Noise Ratio ("SNR") of received transmissions. Each time the number of pulses sent is doubled, the SNR of the received signal will double (increase by 3 dB). This comes at the cost of doubling the amount of time required to complete a full transmission. The transmission strength (radiated power level) is not increased, rather more energy is summed to improve reception.

Description of Radio Block Diagram

Figure 1 below provides a high-level block diagram of the Radio. The radio frequency portion of the Radio consists of the UWB Module, filters, a transmit and receive switch, and a UWB antenna. The processor controls the UWB front end through a Digital Baseband FPGA interface. More specifically, the FPGA acts as a digital baseband to configure and control the UWB module such that it is possible to transmit and receive packets to measure range and to send/receive data.

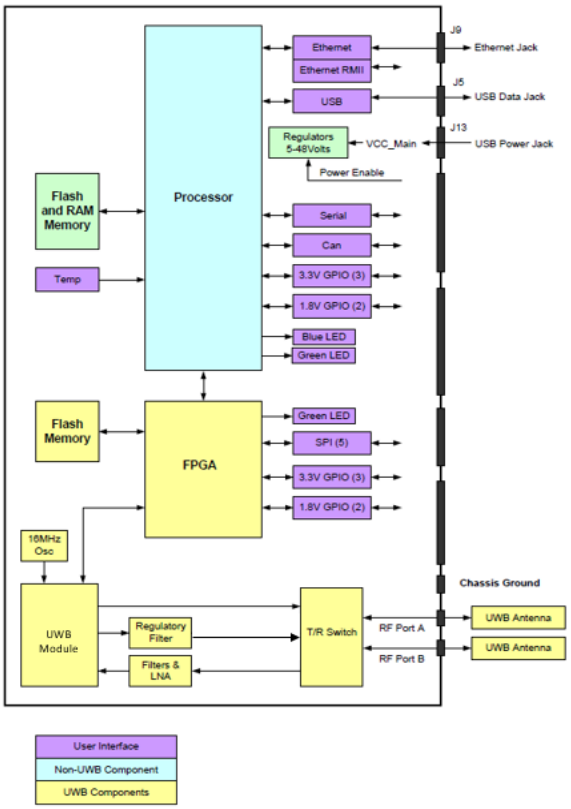

Figure 1 - Radio Block Diagram

Antenna Characteristics

The Radio is designed to operate with a planar elliptical dipole antenna. The only electrical requirement is that the antenna used has a 50 ohm SMA connection. Figures 2 and 3 illustrate, respectively, the azimuth and elevation beam patterns at a 3 GHz transmission frequency.

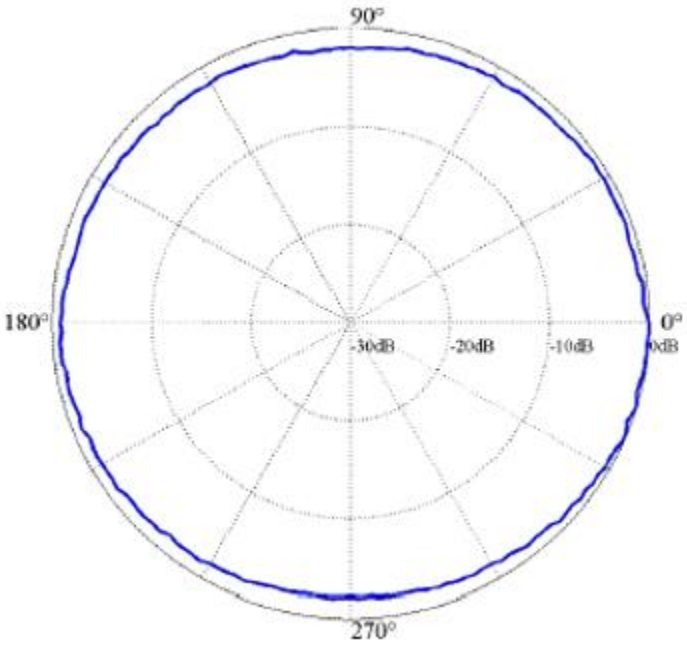

Figure 2 - Azimuth Beam Pattern at 3 GHz

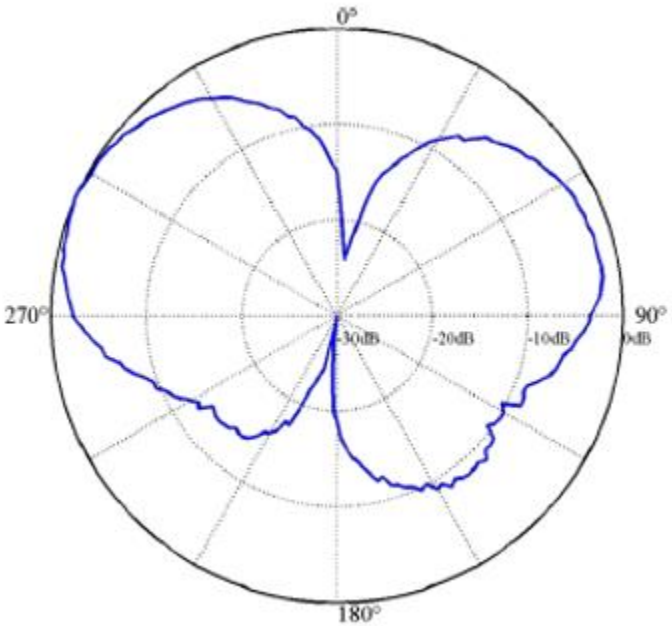

Figure 3 - Elevation Beam Pattern at 3 GHz

Transmission Specifics Relevant to FCC Certification

- Modulation: The Radio uses Binary Phase Shift Keying ("BPSK") modulation.
- Transmit Frequency Range: The transmit frequency range of the Radio is from 3.1 GHz to 4.8 GHz.
- Maximum Power Rating: The Radio has a maximum power spectral density of -41 dBm/MHz.